different at the close of its visibility from that seen at 5:45 is known without any doubt. On first noticing this phenomenon the impression was of a chain of stars, each separated from the next by a short space and all mingling their light into a line of white light of the shape before mentioned, but as a few minutes elapsed this appearance was not so noticeable. From a nearly upright position when first seen it had assumed one at an angle of about 45°, with the upper extremity to the left. There was no head, such as is usually seen in a comet, and one portion seemed as bright as another. Only flecks of cloud were in the sky at that time so that no obstruction interfered at any time. The width of the line of light was about that of a bright star, but in brilliancy it outshone any star in that portion of the sky. Inquiry does not as yet add the testimony of others who might have seen the phenomenon had they been out away from trees and buildings, and while it did not resemble any comet that the observer has ever seen, it has seemed impossible to ascribe any other explanation. Since destructive volcanic disturbances have been reported from Japan near the time this phenomenon was seen, it has been thought best to make a special report aside from that which will be given in the monthly Meteorological Notes.—[Sgd.] H. A. FRISE, Observer.

ANNUAL MEETING ROYAL METEOROLOGICAL SOCIETY.[1]

Mr. C. J. P. Cave, president, in the chair.

* * * The president presented to Mr. W. H. Dines the Symons gold medal for 1914, which the council had awarded him in recognition of his distinguished work in connection with meteorological science.

Mr. Cave, in his presidential address, dealt with the subject of upper-air research. He pointed out that research in the upper air may be [prosecuted] by means of a manned balloon with observer and instrument, or by self-registering instruments sent up in kite, captive balloon, or free balloon. Kites were first used for this purpose by Dr. Wilson of Glasgow, 1749; and also in Arctic expeditions in 1821 and 1836. The box kite and the use of steel piano wire instead of line enabled greater heights to be obtained, and both were adopted by the Blue Hill Observatory in 1895. [See the following historical note.—Ed.]

The use of kites was not taken up in England till 1902, when Mr. Dines flew them from a steamer. After referring to the use of balloons and the ascents made by Glaisher and others, the president said that danger to life in high ascents caused MM. Hermite and Besançon to use a registering balloon in 1893; a free balloon carried a recording instrument, the recovery of the instrument being dependent on the balloon being found after its descent; a height of 9 miles was reached in France, and 13 miles in Germany soon after. He next referred to various types of instruments used in this way, and described Mr. Dines's meteorograph, which is an extremely simple and light instrument. Rubber balloons are generally used, and as they ascend they tell us of the winds above the surface, a special theodolite being used for observing the balloons. The International Commission for Scientific Aeronautics directs the studies for upper-air research, and special days are arranged for international ascents of balloons and kites, stations in various parts of the world taking part in the work. The first great result of these researches has been the discovery that the atmosphere is divided into the troposphere, where the air is in constant movement, horizontal and vertical, and the stratosphere, where turbulent motion seems to cease. The stratosphere begins at about 7.5 miles in these latitudes. The method of investigation is new, but many other results are beginning to come to light, and it seems as though changes of weather do not begin at the surface of the earth, but are dependent upon movements taking place about 7.5 miles up.

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EVOLUTION OF THE METEOROLOGICAL KITE.

Very few appreciate the precise sequence of items in the evolution of a great invention.

In 1890 (see Proceedings International Conference Aerial Navigation held at Chicago, Aug. 1–4, 1893, p. 315) William A. Eddy, of Bayonne, N. J., began his enthusiastic experiments "to evolve the best form of kites to be used in raising self-recording meteorological instruments to a great height," and fully demonstrated the unrealized possibilities of the kite. In August, 1892, his Malay kite penetrated a shower cloud. In July, 1894 (see American Meteorological Journal, vol. 11, p. 298), at the Editor's earnest suggestion he temporarily transferred his experimental kites to the Blue Hill Observatory, established and maintained by the enthusiastic meteorologist, A. Lawrence Rotch.

On July 13, 1893, Prof. M. W. Harrington wrote the article on pages 203–206 of the American Meteorological Journal, volume 10, expressing his belief that any hope of marked improvement must lie in scientific investigation of the upper atmosphere, which he calls "the free air," by means of kites and balloons. A few weeks later, namely, at Chicago on August 1, he communicated to the International Conference on Aerial Navigation (see p. 349 of the proceedings) his paper on systematic explorations of the upper air, following which (see p. 354, op. cit.) the conference unanimously voted "that Congress should in our judgment make necessary appropriation to have the experiments made as recommended by Prof. Harrington." (See also Monthly Weather Review, Washington, July, 1897, p. 313.) At this same conference Mr. Lawrence Hargrave, of Melbourne, gave an account of his box kites and Mr. William A. Eddy of his Malay kite. (Aeronautics, vol. 1, p. 82, and Monthly Weather Review, 1897, p. 311.) The stimulus thus given at this conference, whose origin was due to Mr. Octave Chanute and Prof. A. F. Zahm, marks the beginning of the official kite work in the Weather Bureau, although it is quite true that its importance had been urged and many experiments had been privately and personally carried out during previous years by numerous officials, e. g., Abbe (1871), Hazen (1890), McAdie (1884), Marvin (1891), Potter (1890), Sherman (1879), Waldo (1882). The abrupt and lamentable dismissal of Prof. Harrington, July 1, 1895, interrupted his plans of cooperation in this work and led to the following order of November 18, 1895, by which Prof. Moore placed all further investigations relative to kite, aeroplane and balloons in the hands of Prof. C. F. Marvin:

WASHINGTON, D. C., *November 18, 1895.*

Prof. MARVIN:

You are hereby directed to investigate the problem of constructing appliances for carrying meteorological instruments into the upper air. Authority will be given you for any reasonable expense necessary for construction of appliances used in experiments. It is hoped that you will give early and thorough attention to this matter. You may consult with Prof. Hazen, if you wish, but I am inclined to think that independent action will be better.

You will also please give your attention to the construction of necessary instruments, but this part of the work is not so important as the making of the aeroplane, or balloon.

Very respectfully,

WILLIS L. MOORE, *Chief of Bureau.*

The account of the work done at Blue Hill, published by A. L. Rotch, January 13, 1897, in the Proceedings American Academy of Arts and Sciences, volume 32, pages 245–251, gives interesting historical items generally gathered from the pages of the Monthly Weather Review. The enthusiasm and energy shown by Eddy, at Bayonne, and Rotch, Clayton, and Ferguson, at Blue Hill, is to be compared only with the steady progress made at Washington in the theory, improvement, and construction of every detail in kite work considered as a problem in economic engineering. While recognizing the innumerable experiments and suggestions that are on record since the first work by Alexander Wilson, in 1749, at Glasgow,

[1] From The Athenæum, London, Jan. 24, 1914, p. 139.